



Institutionen för psykologi

# **The influence of attachment on implicit affective opinions towards caregivers**

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## Abstract

The influence of attachment quality and style on implicit emotional opinions towards caregivers was measured using an affective priming task very similar to a lexical decision task. The reaction time in milliseconds for each prime and target word combination was recorded and used as an indication of associative strength between the two. Two attachment tests were administered, the ASQ-Sw questionnaire, a self-report questionnaire with 40 questions measuring attachment style on five different dimensions and an electronic version of the SBST test, which is a narrative-based test measuring the presence of a secure-base script. The priming task had four different primes, mother and father and two control primes and a total of 128 different negative and positive target words. A total of 33 participants completed all of the tests and results show that one of the attachment styles indicating an insecure attachment had an influence on the participants' implicit emotional opinions towards their caregivers, the other attachment styles did not, the two attachment tests were positively linked to each other and showed similar results, gender differences in regard to attachment were also found. The priming task revealed that participants in general had more positive than negative emotional opinions towards their caregivers, especially towards mothers. The participants also had more positive than negative emotional opinions towards the control prime Gandhi but no difference was found for Hitler.

*Keywords: Attachment, priming, secure base script, ASQ, SBST, lexical decision task, affective priming.*

## Sammanfattning

Anknytningens påverkan på implicita emotionella åsikter gentemot vårdnadsgivare studerades genom ett experiment som innehöll en affektiv priming uppgift liknande den välkända lexikala beslutsuppgiften "lexical decision task" (LDT). Reaktions tiden i millisekunder för varje prime och mål ord kombination registrerades och användes som indikator för den associativa styrkan mellan de två. Två anknytningstest administrerades, dels ASQ-Sw testet, som är ett självfrågeformulär innehållande 40 frågor som mäter anknytning på fem olika dimensioner samt en elektronisk version av SBST testet, vilket är ett narrativt test för att mäta förekomsten av säker bas skript. Priming testet hade fyra olika primes, mamma och pappa samt två kontroll primes och totalt 128 stycken olika positiva och negativa mål ord. 33 stycken deltagare genomförda samtliga tre tester och resultaten visade att en av anknytningsstilarna som indikerar en osäker anknytning påverkade deltagarnas implicita emotionella åsikter gentemot deras vårdnadsgivare, de andra anknytningsstilarna uppvisade inget sammanband. De två anknytningstesten som användes var positivt sammanlänkade och visade liknande resultat, könsskillnader i anknytning hittades också. Priming testet visade att deltagarna generellt hade mer positiva än negativa åsikter om deras vårdnadsgivare, speciellt gentemot deras mammor, deltagarna hade också mer positiva än negativa åsikter gentemot Gandhi medan inga skillnader fanns för Hitler

Nyckelord: Anknytning, priming, säker bas skript, ASQ, SBST, lexical decision task, affektiv priming.

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## ***Introduction***

The affectionate bond that is created during infancy and early childhood between the child and the caregiver through interactions between them is called attachment (Bowlby, 1969). The child creates mental representations, so called *internal working models* of attachment, based on her attachment related experiences. These representations hold information about the self, others and the world. Internal working models must be organized into cognitive structures and affect socio-cognitive functions like emotional reactivity, emotional regulation and the attention and processing of emotional information. Research so far does not give a complete picture about how different attachment styles and resulting internal working models correspond to cognitive structures (Cassidy & Dykas, 2011). This work is trying to investigate if and how different attachment styles and internal working models affect the automatic processing and responses to emotional information about caregivers.

## ***Background***

Attachment, as meant in the psychological sense, may be defined as “*an affectional tie that one person or animal forms between himself and another specific one - a tie that binds them together in space and endures over time.*” (Ainsworth & Bell, 1970, p. 50). Bowlby (1969/1982) postulated that evolution has favored attachment behaviors, since they increase the likelihood of child-mother proximity, which in turn provide greater chances of protection and thus survival. The beneficial outcomes for a child, that come out of staying in close proximity to the mother, are adequate feeding, learning about the environment, social interaction and protection from dangers. Thus, according to Bowlby (1969/1982), infants are predisposed to seek their parents in times of distress. From this it can be said that attachment is considered a normal and healthy behavior of humans throughout their lifespan and not immature behavior that needs to be outgrown.

### *The basics of attachment*

Typical attachment behaviors are considered to be organized into a so called “attachment behavioral system” (Cassidy & Shaver, 2008) This behavioral system is based on an inherent motivation and is not a by-product of any other drive in humans, as research has shown that attachment is not a result of associations with feeding or other pleasurable associations, since even infants who have abusive mothers become attached to their mothers. The primary goal of the child’s every attachment behavior is to attain close proximity to the primary caregiver so that she can achieve what researchers call “felt security”, whether this is accomplished by the infant's crawling, running, walking, crying or any other type behavior that can be used to signal attachment needs. The infant does normally develop multiple attachments. The mother is almost always one of the persons that the infant develops an attachment bond to, the father is usually also one but attachment bonds may also be established between the infant and her siblings and/or grandparents. Attachment bonds are thought to be placed in a hierarchy, where most important attachment bonds are highest in the hierarchy, so that the infant knows whom to first seek in times of discomfort and distress (Cassidy & Shaver, 2008).

Bowlby (1973) pointed out that it is important to put the attachment system into context with other behavioral systems in the child, namely the exploratory system and the fear system, these two being intertwined and affecting each other. The exploratory system motivates the child to explore its surroundings, the objects in it, how they work and what they are for. This system is important from an evolutionary viewpoint since it lets the child learn about the world and gain knowledge and skills so it can survive and thrive. When the exploratory system increases its activity, the child increases its distance from its caregivers in order to explore. At the same time, the child's attachment system decreases and its typical behaviors, such as signaling for the caregivers’ attention in order to soothe distress or keeping a close proximity to the caregiver, decrease with it. The fear system simply warns the child about dangers in the environment. These could be obvious and direct dangers, like predators, or it could be more situations or circumstances that increase the likelihood of danger, such as being alone, loud noises or darkness. The fear system has a protective function: when the child experiences fear she wants to be protected and calmed so when the fear system is activated, the attachment system increases its activation too, in order to decrease the fear system. Ainsworth (1972) captured well this interplay



between the systems, by saying “*the dynamic equilibrium between these two behavioral systems is even more significant for development (and for survival) than either in isolation*” (p. 118). Indeed, Ainsworth (1963) said that the child uses the caregiver as “a secure base” from which she can explore her surroundings, keeping the caregiver in proximity so that caregiver can easily be found when needed. This proximity enables the child to feel safe and calm when she explores the world and learns about it. If the child felt afraid all the time and insecure about the whereabouts of the caregiver, the child would not be interested or capable of exploring her surroundings and learning from them.

### *Individual differences in attachment*

The behavior of the primary caregiver, and the experience the child has of this behavior, creates the attachment bond, which can be of different types and different quality. Ainsworth, Blehar, Waters and Wall (1978) were able to categorize attachment behaviors into three different categories, them being secure, anxious-avoidant (insecure) and anxious-ambivalent or resistant (insecure). Main and Solomon (1986) later defined also a fourth style, the disorganized (insecure). Ainsworth and colleagues (1978) concluded that these different attachment styles that emerged due to what experiences the child had with her caregivers were not only caused by the parent being available or absent, but also by how the infant interpreted the parent’s behavior towards her.

They also found that children with different attachment styles exhibit different behaviors in the *Strange Situation* experiment (Ainsworth et al., 1978). Infants who have developed an anxious-ambivalent style are preoccupied with their parents’ whereabouts and want to be really close to them all the time, so they are not too much focused on playing with the toys and exploring their surroundings. When the parents leave the room, these infants cry extensively and when the parents return and there is a possibility for everything to soon be okay again, these infants are not able to calm down and return to relaxed play. Avoidant infants are quite the opposite, they care very little about their caregivers’ whereabouts in the room and if the caregivers leave and then return, the infants react very little or not at all. The disorganized attachment style in the infant involves showing contradictory and conflicting behaviors when interacting with the parent in the *strange situation*. This is believed to be caused by the infant’s inability to maintain a coherent attachment strategy, so it is not unusual that the infant’s behavior

oscillates from exhibiting extreme anger feats to behavioral freezing or even direct fear of the parent. Secure infants are mostly calm and playful in their parents' proximity. When the parents leave the room these infants become clearly distressed, but are easily comforted and calm down when their parents return.

The mechanisms by which attachment experiences affect our emotions and behavior are what researchers call internal working models (IWMs) of attachment. The attachment IWM is a kind of mental representation of the world and the people in it (including the child itself) that helps the child or adult to make predictions about what to expect in different situations and what behavior they can expect from different people. Attachment researchers claim that these IWMs are to a great extent based on individuals' experiences with their primary caregivers during infancy and later childhood (Bretherton, 1985). IWMs are based on information about what happened in the interactions with significant others, who was there, where the interactions took place and what kind of affects that the person experienced (Bretherton, 1985). So through the process of attachment the child develops IWMs whose purpose is to hold information about the self, significant others and relationships to significant people in an organized structure, so that the child can have expectations and make predictions about their self and others and relationships in the future (Bowlby, 1980; Bretherton, 1985, 1990; Collins & Read, 1994). Thus, IWMs consist of processes that affect how we interpret different situations, what information we tend to turn our attention to and what we remember of the past. These processes of the IWMs are hypothesized to function outside our conscious awareness (Bowlby, 1980; Bretherton, 1985, 1990; Main, Kaplan & Cassidy, 1985).

IWMs are not just a single set of models of the self and others but rather consist of a family of models that are organized hierarchically, having higher levels where more generalized information is stored, such as abstract rules and general assumptions about self and others, middle levels where information about different kinds of relationships are stored, like romantic relationships or parent-child relationships, and lower levels where the information is event-specific, such that reflects the experiences of one's relationship with a particular person (Fivush, 2006).

Bowlby (1980) made an argument that several processes kept the IWM relative stable. Since the child becomes used to her caregivers' behavior, she creates a biased representation of the caregiver as "good" or "bad" and will not likely be affected by smaller deviations from that behavior that caused the biased representation in the first place. Also, these interaction patterns become fairly automatized thus requiring less attention. They also start to operate outside awareness and therefore the IWM will less likely be revised. Since there are two persons involved in the creation of the IWMs (the child and the caregiver), if one person changes her behavior, the other one will most likely try to change it back to the former pattern of behavior. This being said, it has been suggested that when the current IWM no longer creates good predictions of relationships and social interactions, the IWM will begin to change (Cassidy, 2008).

So in summary, every situation we face as humans in our everyday life we construe through our representational models of the world, ourselves and others. These models decide which information we select and attend to in a situation, how we interpret and value that information and what kind of action we plan to execute based on the information. This interpretation and evaluation of every situation also affects to a high extent how we feel in the situation.

### *The Secure Base Script*

Another theoretical concept that relates to IWMs is scripts or generic event representations (GERs) (Waters & Waters, 2006). A script is a cognitive scheme that the child develops early in life. Besides organizing information, one of the functions of scripts is to tell the child what to expect from caregivers in different situations, thus guiding the child's strategies when in need of help and comfort and prescribing whom the child can turn to. Through sensori-motor experiences with her caregivers, the child develops these early scripts. For example, if the mom has been attentive to her child's signals when she has been feeling distressed and in need of help and if the mother has been successful in calming her child and relieving her of the distress, then the child will most likely develop a script similar to "When I feel distressed/Mom makes me feel better". Children who develop a secure attachment will most likely have developed what researchers call a "secure base script", which means that the child knows that when distressed or in need of help, someone will be there to help and soothe. If the opposite occurs, that is, when

the child experiences distress and signals the need for help the mother doesn't respond or responds inadequately, then the script will more likely be similar to "When I feel distressed/No one relieves me of this distress" so that this early script does not contain information of a secure base. This makes it easier to understand how early attachment representations can affect adaptive functions such as the individual's self-esteem. For example, if the child receives help and comfort in times of distress, it will develop a script similar to "My caregivers care for me and help me/Therefore I am lovable". This affects how the person feels about themselves throughout childhood and later on, since they will most likely look upon themselves as worthy of love and care, others as good and trustworthy, and the world as a place safe to be in (Fivush, 2006).

It was first thought that the child developed scripts based on the average of her continuous experiences of interaction with different important people in the world so to speak, but research now shows that children create scripts based on their first experiences and after that they tend to have the same assumptions and expectations of similar situations. This is in order to be able to establish a script quickly, though based on very few experiences. Thus, early scripts are very general and vague (Fivush, 2006). Not until these first scripts are formed fully do children start to look for and take in deviances and differences in the situations they encounter, and when this is done repeatedly, the scripts become more and more elaborate, complex and nuanced. Still it seems that the first scripts that are formed, the ones that could be placed highest up in the representational hierarchy, such as "When I cry/Mother helps me", are likely to stay quite stable over time. However, they may not be used to generalize to each and every other situation and person, since later experiences during childhood will most likely add to the complexity and nuance of scripts at lower levels in the hierarchy, which would include new situations and persons. Such nuances could, for instance include "When I cry because I don't get what I want/Mother won't help me" or different persons, "When I cry/Father doesn't help me". It has been suggested that since this seems to be true for attachment scripts, it may also apply to the whole system of IWMs of attachment (Fivush, 2006).

Attachment scripts have been studied in early childhood (Wong et al., 2011), middle childhood (Psouni & Apetroaia, 2013), adolescence (Dykas et al., 2006) and adulthood (e.g. Vaughn, Verissimo, Coppola, Bost, et al., 2006). They are known to be stable over time (Vaughn, et al., 2006), have been found in multiple cultures (Coppola, Vaughn, Cassibba, & Costantini,

2006) and are found in both biological and adoptive children (Verissimo & Salvaterra, 2006). It is thought that these attachment related scripts are the building blocks of the attachment IWMs but the relationship and difference between scripts and IWMs is still not completely clear, although it is believed that scripts are small summaries of the individual's past attachment experiences and that these create the working models that in turn affect and organize the behavioral strategies in the present when it comes to attachment relationships and the information processing involved in them (Main et al., 1985). One of the characteristics of people who have developed a secure attachment is that they have more elaborated and coherent memories of attachment related events and that their IWMs and their early scripts are more elaborate and coherently constructed. Indeed, Psouni & Apetroaia (2013) found strong convergence between elaborateness in children's attachment scripts and the coherence in their attachment representations. Researchers believe that one reason for this is that the mothers of many securely attached children talk about different experiences and events that occur. The more elaborate and rich language the mothers use the more elaborate the IWMs and scripts become in the child. By talking about the events and situations the child is experiencing, she is also able to create meaning of these experiences (Cassidy & Shaver, 2008).

#### *Developmental effects of attachment*

One of the major tenets in attachment research is that the attachment quality between the caregiver and the infant give rise to effects in psychological development throughout childhood and adulthood. As mentioned earlier, the first experiences the infant has of her caregivers' behavior creates a very simple but stable blueprint of IWM's in her mind, a blueprint that contains information about herself, the world, and other people. The effects of this can be seen through how people with different attachment styles differ in the way they organize and direct their attention and memories in relation to attachment-relevant social information (information regarding oneself, others and the world). People process this information in biased ways, one way is by directing their awareness away from or to certain stimuli/information and another way is interpreting this information in positive or negative ways, this is not necessarily done in conscious ways. So people with different attachment styles and internal working models will in the exact same social situation attend to different information and stimuli and also interpret the information in different ways depending on their attachment styles. One person may be more

attentive towards recognizing smiling faces than neutral or angry ones in a crowd, and interpret peoples' reactions to her/him as a sign that she/he is liked, while another person may be more attentive towards neutral or angry faces in a crowd and more likely to interpret these neutral or angry faces as a sign of them not being liked. A third person may not be interested or attentive towards others at all. People will also differ in how they access attachment-related information from memory, some people attend more to memories involving rejection and neglect and some people attend more to memories of caring and love, while some may attend to memories that are neither positive or negative and very emotionally dampened (Dykas & Cassidy, 2011).

The type of attachment that a person experiences as an infant/child also influences emotional responses, emotional self-regulation and behavioral regulation/synchrony (Cassidy, 2008). People who are more characterized by the anxious-ambivalent type tend to report more intense emotions, more ups and downs in their emotional life, a high level of emotional expressiveness and high anxiety and impulsiveness. This can be contrasted to the people that are more characterized by the anxious-avoidant, who tend to report being more emotionally dampened, less emotionally expressive and better at suppressing their feelings (Pietromonaco & Feldman-Barett, 2000).

A prospective longitudinal study (Sroufe, Egeland, Carlson, & Collins, 2005) also managed to show that early attachment significantly affected personality traits such as self-esteem, self-confidence, positive affect, ego resiliency and social competence throughout childhood and adolescence, but few other studies have replicated these exact findings, only parts have been replicated. Research has shown that children with a secure attachment have a greater general understanding of emotions than children with an insecure attachment (Cassidy & Shaver, 2008). They understand negative and mixed feelings better and are better at correctly identifying emotions in others. Attachment has also been shown to influence the development of conscience in children, children with a secure attachment tend to be better at cooperating and show greater compliance (Cassidy, 2008). Children with secure attachment also have better peer competence, they cope better with failure and are more enthusiastic and persistence in problem solving (Sroufe et al, 2005).

The type of attachment that a person experiences as an infant/child also influences expectations and beliefs about self and others. Specific effects involve people's explanations for relationship events, views of and behavior in romantic relationships, as well as preferences and likings of particular kinds of partners (Pietromonaco & Feldman-Barett, 2000). Thus, it is not surprising that a link between different attachment styles and behavior and experiences in romantic relationship has also been established in research (Hazan & Shaver, 1987). Individuals with the anxious attachment style tend to crave intimacy and closeness and are very sensitive to minor shifts in their partners moods since these could be interpreted as signs of rejection, they trust their partner's less and worry that they are not loved. Individuals with the avoidant attachment style tend to avoid intimacy and closeness since it threatens their autonomy. They are less concerned about their partner and the relationship and also express less feelings, both positive and negative. Individuals with secure attachment style are comfortable with intimacy and with sharing their feelings with their partner, they trust their partners and don't obsessively fear being left by them, they also have more positive feelings about relationships than the anxious and avoidant types.

#### *Methods for assessing attachment*

There are several developed instruments that are used in order to investigate attachment experiences, IWMs, scripts and attachment styles in general. One of the most widely used is the *Adult Attachment Interview* (AAI: George, Kaplan & Main, 1984/1996), where the adult is interviewed about the relationship with their parents in general and also more specifically about situations in which more attachment relevant systems were active (upset, separation, illness, loss) and questions about what meaning the adult has created from these experiences and how their own personality has developed and if possible, experiences of they are as parents themselves.

The methodology that focuses on individuals' attachment scripts is based on word prompted narrative creation. The *Attachment Script Assessment* (ASA: Waters & Rodrigues-Doolabh, 2004) for adults and the *Secure Base Script Test* for middle childhood (SBST: Psouni & Apetroaia 2013) are two such tests for which reliability and validity has been demonstrated in the literature. These methods let the subject narrate stories based upon twelve prompt words that loosely gives the subject a guideline for a storyline that relates to attachment interactions. An

indicator of a secure base script, and thus a secure attachment style, is a story that has an elaborate and rich language and interaction between the characters in it and that the anticipated problem/crisis in the story is resolved and that this is with feelings of responsiveness and sensitivity in the characters. The opposite, a story that lacks an elaborate story and language and is characterized by unresponsive and insensitive characters would be an indicator of an insecure attachment style. The ASA test correlates with the AAI moderately (Coppola et al., 2006; Waters & Waters, 2006), while strong convergence has been shown between the SBST and attachment interviews like the AAI but suited for children (Psouni & Apetroaia, 2013). Other questionnaires are also used in attachment research. The *Attachment Style Questionnaire* developed by Feeney, Noller and Hanrahan (1994) is one of them and it assess attachment by letting the individual answer how much they agree with statements regard their view of themselves, others and relationships that. Compared to other questionnaires used in attachment research, like the *Experience of Close Relationships* (ECR-R: Fraley, Waller, & Brennan, 2000), it doesn't involve questions about romantic relationships, which makes the ASQ suitable also for individuals that are not involved in a romantic relationship.

The greater part of research conducted within the field of attachment has been done by using different interviewing, self-report and observational methods to investigate the quality and structure of the attachment-related systems and its subparts (IWMs, scripts etc.). However, another way of investigating and assessing the attachment-related system has been used more recently, based on the observation that priming participants with words, pictures or sounds, can activate certain attachment related structures and gain information about their quality and function. The priming paradigm refers to the mechanisms where recent or current experience passively (without an intervening act of will) creates an internal readiness, so when a person sees the word "food", it will make words that the person associates with "food" more accessible to awareness, probably like "pizza" or "hamburger", compared to words that are not associated with "food", for example "sky" or "tree" (Bargh & Chartrand, 2000). There are several different priming techniques, conceptual, mindset and sequential for example, the one most suited for research regarding attachment information in cognitive structures is the sequential technique. The sequential technique examines the relation and associative strength between related representations, when two concepts belong to the same category the relation is called semantic association. In the example previously, the word "food" would belong to the same category as



the word “hamburger” and create a semantic association but the word “tree” and “food” is not in the same category and would not create the semantic association. These associations are called cold associations since they are only based on semantic knowledge, that is, the knowledge of the words (Neely, 1991).

In order to use this technique when investigating attachment information, the target word must be an affective one instead - what researchers call the affective priming paradigm. It is thought that cognitive and affective representations are stored together in memory systems as nodes and are also linked to other affectively and cognitively congruent nodes (Bower, 1981; 1991). This makes it possible to investigate the existence and strength of associations between cognitive representations, like “fruit” and affective ones like “tasty” or “disgusting”. The association is measured by *yes* and *no* responses and reaction-time (RT) to the word pair (prime-target). Thus, the subject is asked to answer yes if the association is right according to the person (fruit-good) and no if it is wrong (fruit-disgusting), and since RTs for these answers are also recorded, it is possible to see how strong the association or non-association is between the words, with a quick response indicating a heightened availability for the target word based on the prime word (Klauer & Musch, 2003; Fazio et al., 1986; Bower, 1981).

A specific cognitive task suitable for investigating attachment related cognitive structures and functions is the lexical decision task (Meyer & Schvaneveldt, 1971; Wentura, 2000; Hutchingson, 2003). It has been shown that a quicker RT to the target word is an indication of higher accessibility of the word in memory structures (Fischler & Bloom, 1979), which makes it possible to measure availability and strength of affective words in relation to caregivers like “mother” and “father” and thus assessing quality of attachment.

### ***Previous research***

Several studies have used a priming paradigm, often the lexical decision task, to investigate how attachment related information is stored and organized in cognitive structures. Some of the studies have shown that inducing a threat prime subliminally increases the accessibility of the caregivers’ names (Carr & Landau, 2012; Mikulincer, Gillath, & Shaver, 2002). Other studies using priming paradigms have shown that insecure individuals under stress react more quickly to attachment related words than do secure individuals (Mikulincer,

Birnbaum, Woddis, & Nachmias, 2000) while secure individuals make more positive predictions about romantic relationships and interpersonal outcomes (Baldwin, Fehr, Keedian, Seidel, et al., 1993; Baldwin & Meunier, 1999; Zayas & Shoda, 2005) and also have greater desire to explore social, intellectual and physical environments (Green & Campbell, 2000).

Studies have shown that people characterized by the avoidant attachment style activate more negative self-representations under high cognitive load than people low in avoidance (Mikulincer, Dolev & Shaver, 2004). Furthermore, seven studies with varying results have been successful in investigating how priming people with secure base schemas affect their evaluation of neutral and positive stimuli (for a review see Mikulincer, Hirschberger, Nachmias, & Omri Gillath, 2001). Research on attachment by using priming paradigms has also been used together with recordings of event related potentials (ERP), showing that anxious-ambivalent individuals show higher sensitivity to potential partner rejection cues (Zayas, Shoda, Mischel, Osterhout & Takahashi, 2009).

### *Purpose of this study*

The present study's main goal was to investigate if people with different attachment styles differ in their implicit affective opinions about their primary caregivers. More specifically, will attachment security, assessed through different approaches and measures, correlate with the test that measures implicit associations of caregivers with affective attributes? The proposed hypothesis was that the more insecurely attached a person is the more implicit negative affective reactions towards one or both of their caregivers they should have. Similarly, the more securely attached an individual is, the more implicit positive affective reactions she/he should have. Insecurely attached people would thus have less difference in average RTs between the mother/father positive word combinations and the mother-father negative word combinations, compared to the securely attached people who would have a greater difference in average RT between the two combinations. In general also, insecurely attached people would have shorter average RT's than the securely attached for the mother/father negative word trials and longer for the mother/father positive word trials.

For this study, we built a control trial that presents affect loaded targets (positive and negative attributes) after primes that might be associated with positive respectively negative affective reactions, but who are not the caregivers. As this kind of control has never been used previously in attachment research, a secondary aim of the study was thus to compare participants' responses to these combinations with their responses to affect targets matched with caregivers.

Finally, we addressed attachment style via a self-administered questionnaire that looks at peoples' explicit views about themselves, others and the world and through a prompted narrative-based test of scripted secure base knowledge that is looking at more implicit parts of the attachment system like scripts. So a final hypothesis is that, hopefully, the two methods are tapping into two different types of attachment information but are both valuable in assessing attachment quality and styles such that can be related to RTs to affect related stimuli put in the context of one's caregivers. Furthermore can the study maybe answer if an electronic version of the SBST test, which is normally administered verbally, can yield reliable results too?

## *Method*

### *Participants*

Participants were recruited through information flyers throughout the university area, through information talks in classes about the study and e-mails to students. The same information was given at every place. The only requirement for participation in the study was that the participant had to be 18 years or older and fluent in Swedish. A total of 33 participants completed all the three parts of the experiment, their mean age was 25.87 years (SD = 5.16) and it was 36.3% men (n = 12) and 63.6% women (n= 21) who participated. The mean age for the men was 24.75 years (SD = 6.13) and for the women it was 26.35 years (SD = 4.55). All participants were currently enrolled at Lund University.

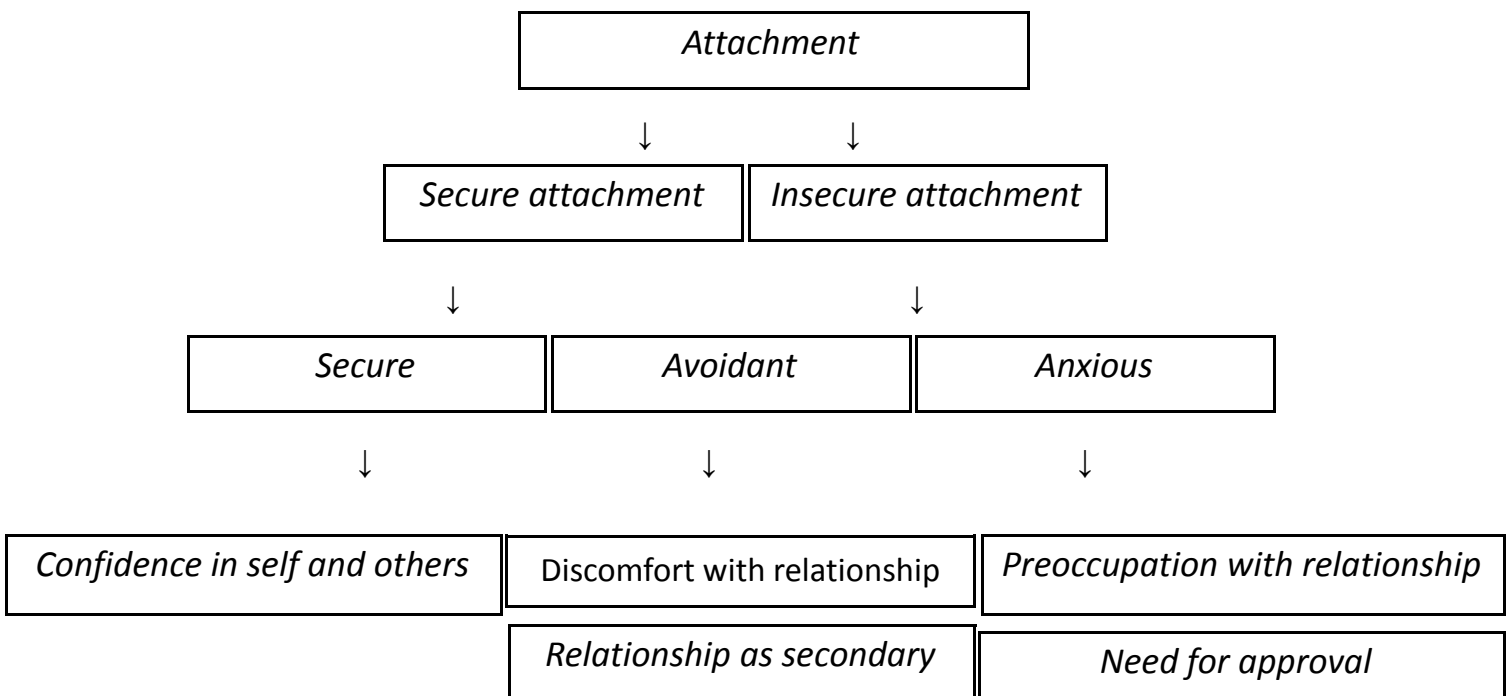
### *Materials and procedure*

The study consisted of three parts: After completing a consent form where participants confirmed that they had received enough information about the study, that they knew that that at any time they could withdraw their participation in the study and that they wanted to participate

in the study, participants were asked to fill out an attachment questionnaire in paper form, then they made up stories for assessment of their secure-base scripts, and finally participated in a RT-experiment.

*Attachment Style Questionnaire- Swedish version*

*ASQ-Sw*). The ASQ-Sw is a Swedish translation of the original ASQ-A developed by Feeney, Noller and Hanrahan (1994). The Swedish version was translated and tested in a Swedish population by Tengström and Håkansson (1997), see article for more information about the Swedish version. The ASQ-Sw assesses a person’s attachment style. It contains 40 questions organized in five sub-scales: (a) confidence in self and others, (b) discomfort with relationships, (c) relationships as secondary, (d) need for approval and (e) preoccupation with relationships. Each question has six different options of answers ranging from “completely disagreeing” to “fully agreeing”. Answering “completely disagreeing” would then score as 1 point while “fully agreeing” would score as 6 points. For every sub-scale the mean of the items measuring the sub-scale is calculated. The *confidence in self and others* scale is the one measuring a secure attachment while the other four are measuring two different types of insecure attachment, see Figure 1 below.



*Figure 1 ASQ-Sw hierarchy of attachment*

The five subscales are described as follows:

*Preoccupation with relationship:* A component of the insecure and anxious attachment style that involves an anxious, extreme need to be close very close to others in order to fill needs of belonging and security.

*Need for approval:* A component of the insecure and anxious attachment style, is characterized by the person having an anxious need for others approval and acceptance.

*Discomfort with relationship:* An component of the insecure avoidant attachment style that is characterized by the person becoming anxious and uncomfortable in human relationships, as persons with a distant attachment style protect themselves from being hurt by not creating emotional bonds to people but instead keeping others at distance.

*Relationship as secondary:* This is an attachment style that is characterized by insecurity and keeping distance to people in relationships, independence from others and personal achievement is more valued than relationships for this person.

*Confidence in self and others:* A component of the secure attachment style, is characterized by the person having a trusting relationship to themselves and others and that they feel secure in themselves. They can also create emotional bonds to others and lose them without becoming too anxious or distressed.

The ASQ-Sw is foremost a dimensional assessment tool for attachment and not a categorical one, the results of the questionnaire are made into a profile with the five sub-scales represented and it is the score on each sub-scale and the relationship between the sub-scales that is of interest, not the total mean score of all the sub-scales. Although one categorical distinction is made, if a person has a mean score of 4 or higher on the scale "confidence in self and others" and on the other four sub-scales measuring insecure attachment they have a score around the mean or under compared to the reference population they are considered to have a secure

attachment. But since the ASQ-Sw is a dimensional questionnaire, every profile of both the secure and insecurely attachment people will look different (see Figure 2).

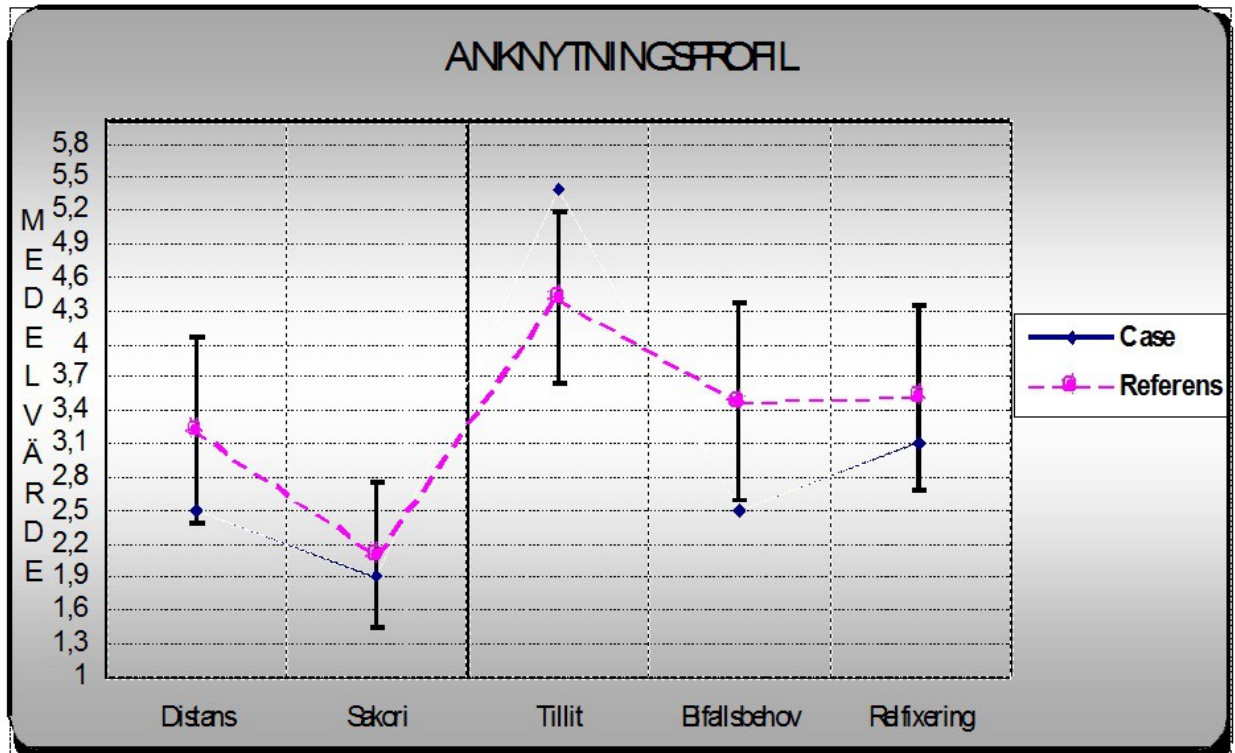


Figure 2: A secure attachment style profile as assessed by the ASQ-Sw. Adopted from Tengström and Håkansson (1997).

The line that indicates "case" in Figure 2 is thus the profile of the person with a secure attachment style, the other one being the reference profile (Tengström & Håkansson, 1997). By looking at this profile it is easy to see that every person's attachment profile will be unique, even though a secure person has to score high on the secure subscale, her/his score on other subscales can differ from another person with a secure attachment style.

In the present study, internal consistency for each of the five sub-scales of the ASQ-Sw, calculated by Cronbach's alpha, were for the sub-scale "Preoccupation with relationship" (8 items) .46, for "Discomfort with relationship" (10 items) .83, for "need for approval" (7 items) .60, for "Relationship as secondary" (7 items).51 and for "Confidence in self and others" (8 items) .80. The two sub-scales "Discomfort with relationship" and "Confidence in self and others" thus have high internal consistency while the three others are lower.

### *Secure Base Script Test*

Participants attachment scripts were assessed according to the *Secure Base Script Test* (SBST: Psouni & Apetroaia, 2011; 2013). The SBST test assesses *secure base scripts* (SBS). Participants were asked to create four separate stories based on four different sets of words, each containing twelve words that had an explicit structure to them that would loosely outline the storyline for them. participants were instructed that they could change some of the words and a little bit of the order of them but in general try to stick with the given words and structure. A sufficiently developed secure base script will be activated by the prompt words given to the participants.

Two versions of the test exist, one for females and one for males, the difference between them being the main character's name, in the female version it is a girl named "Ebba" and in the male version it is a boy named "Robin", so that the subject can more easily identify with the main character in the story. The four stories that were used here were "Accident", "Party", "Tournament" and "Math test". "Accident" and "Math test" contained the word mother but not father while "Party" and "Tournament" contained the word father but not mother, this way attachment related to both mother and father could be assessed as well as the general attachment. The two stories "Tournament" and "Party" were adopted from Dykas and colleagues' (2006) test that assess SBSs in adolescence. Stories are scored based on a scoring manual (Psouni & Apetroaia, 2011), for evidence of knowledge of secure base in their content, on a scale 1-7, where 1-3.99 indicates an insecure attachment and 4-7 a secure attachment, there is also a continuum in the scale so a 6.5 reflects a more secure attachment than 4.5. A story rich in SBS content and well elaborated will score a 6 or 7, a story with moderate content will score 5 and a

story with minimal SBS content will score 4. Furthermore, a story lacking any emotional states or interaction will score 3 and if it is also short and disjointed it will score as 2 and story containing a very odd or completely different theme will score as 1 (Psouni & Apetroaia, 2011).

In the present study, the test was administered on a computer electronically, the subject was given instructions on the screen and then given the twelve words arranged in the predetermined outline on the screen while having a text box beneath the words where they could write their story. Usually this test is administered verbally where the subject receives the twelve words on a paper next to them and then tells the story verbally to a voice recorder and then the recording is transcribed and scored, an electronic version of the test has not been used before. The measurement of scripted attachment knowledge based on word prompts was first applied in adult populations, and the word-prompt based measure for adults (Attachment Script Assessment, ASA: Waters & Rodriguez-Doolabh, 2004) has been used in several studies with adults, mainly parents. ASA scriptedness builds on stories narrated based on 4 themes: two themes involve parent-child interactions where the word prompts are selected with an adult perspective in mind, and two concern romantic relationships. Since participants in this investigation were young adults, some were late teens, none of them a parent and perhaps many of them not yet in long-term romantic relationships, we decided to use for measurement of scripted attachment knowledge a test that is usually used with children in middle school and adolescents, since this test (the Secure Base Script Tests, SBST: Psouni & Apetroaia, 2013) builds on stories (the prompted word sets) on themes that are similar to the ASA parent-child interactions but with a child perspective in mind, while it does not contain any themes involving interaction between romantic partners. Thus, all prompted word sets used for assessment of scripted knowledge of attachment in the present investigation are examples of mother/father-child interactions and not adult-adult interactions. The internal consistency of the four stories used here was Cronbach's alpha = .879.

### *Priming task*

The third part of the experiment was a computerized priming task (PT) measuring reaction time (RT), very similar to the *lexical decision task* (Meyer & Schvaneveldt, 1971; Wentura, 2000; Hutchingson, 2003). The theory behind this test is that the reaction times (RT) will be shorter if the priming word and the target word are strongly associated and longer if they



are less associated (Wentura, 2000; Hutchingson, 2003). By using attachment-related primes and target words, prime words such as "mother" and "father" and target words such as "loving" and "dismissive" it is thought that the mean RTs will correlate with attachment quality. Priming tasks measuring RTs to word associations have, as earlier noted, been used several times in other studies measuring attachment (Baldwin, Fehr, Keedian, Seidel, et al., 1993; Baldwin & Meunier, 1999; Green & Campbell, 2000; Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer, Hirschberger, Nachmias, & Omri Gillath, 2001; Mikulincer, Gillath, & Shaver, 2002; Dolev & Shaver, 2004; Zayas & Shoda, 2005; Zayas, et al, 2009; Carr & Landau, 2012).

Participants were asked to decide if two words that had been shown in fast sequence were associated according to participants' opinion, by answering *yes* or *no* on the keyboard. First a fixation cross appeared on the screen and then the priming word was presented and after that the target word appeared until the subject had given its answer *yes* or *no*. The time interval from the onset of the prime word to exposure of the target word was 250 ms (SOA) and was thus kept under 300ms which is consistent with previous studies that has restricted presentation time to below 300ms (Neely, 1991; Bargh, Chaiken, Raymond, & Hymes, 1996; Glaser & Banaji, 1999; Wentura, 2000; Maier, Berner, & Pekrun, 2003; Maier et al., 2004; Pecchinenda, Ganteaume, & Banse, 2006) and was thus supraliminal. The first part of the test consisted of 12 trials which were practice trials with the two priming words "frukt" and "fordon" and the six target words "kiwi" "äpple" "banan" "traktor" "bil" "flygplan", the words were counterbalanced so both "frukt" and "fordon" appeared with all the six target words once, the practice trial was conducted so the subject became familiar with the test itself.

After the practice trial the next trial started but the two priming words was now "Hitler" and "Gandhi". This trial was thought to be used as control trial to see if participants differed in their RTs when prompted with a affectively positive prime "Gandhi" and a negative target "evil" (incongruency) compared to when prompted with affectively positive prime "Gandhi" and positive target "kind" (congruency) and also if they differed in RTs when shown a affectively negative prime "Hitler" and positive target "kind" (incongruency) compared to affectively negative prime "Hitler" and negative target "evil" (congruency). The idea of the control trial is to use it as a comparison to the mother/father trial, the primes "Gandhi" and "Hitler" is thought to represent distinctly affective positive and negative figures and if the prime words work, the

results from these trials can then be used to compare with the mother/father trials as an indication of someone as a affectively positive or negative figure. The priming words were shown with 27 positive target words and 27 negative target words, so each subject went through a total of 54 trials under this condition. The target words were adjectives that described personality traits and behaviors in people and that specifically easily could be associated to one of the priming words "Gandhi" and "Hitler", the target words were also thought to be attachment-related. The target words were also assessed on how frequently they are used in the Swedish language by using a corpus database called "bloggmix" that contains words from Swedish blogs between 1998-2013 (See appendix 1 and 2).

The third part of the PT was similar to the control part but now the priming words were "mother" and "father" and there were 34 positive and 34 negative target words (a total of 68 trials) all of them being different from the ones used in the control part but still being adjectives that reflected personality traits and behaviors in people that can be related to attachment, see Appendix 1 for these target words.

The attachment-related trials were chosen based on word lists that had been used in prior priming studies that also investigated attachment related information by using priming tests measuring RT (Baldwin, Fehr, Keedian, Seidel, et al., 1993; Baldwin & Meunier, 1999; Green & Campbell, 2000; Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer, Hirschberger, Nachmias, & Omri Gillath, 2001; Mikulincer, Gillath, & Shaver, 2002; Dolev & Shaver, 2004; Zayas & Shoda, 2005; Zayas, et al, 2009; Carr & Landau, 2012) and words that in general are thought to reflect attachment interaction. Having a different number of words in the control and attachment trial, 27 positive and negative words in the control trial and 34 in the attachment trial, was due to the fact that it was impossible to find enough words reflecting different personality traits, especially positive ones. All in all, each subject went through 122 trials during the PT, the allocation of stimulus words to each trial was counterbalanced over all participants. Two versions of the test were created, one version which had the yes button on the left arrow and the no button on the right and another version with the yes button on the right arrow and the no button on the left arrow. participants were asked before the test what their personal preference was and the instructions on the screen were adjusted accordingly.

In order to simplify the structure and idea behind the study, one has to remember that the study is investigating how different attachment styles may affect the implicit affective opinions people have towards their caregivers. The attachment styles are assessed by the two attachment tests mentioned earlier and they give indications of attachment styles with their respective scales. The priming-task measures associations between the words "mother" and "father" and affective words that describe characteristics or behaviors and can be used to describe people. The reaction-times between the "mother" and "father" words (primes) and these affective words is a measure of the associative strength between them. So a person with a shorter mean reaction time for the word combinations "mother" + positive words, compared to "mother" + negative words, is thought of as an indication of the person having more positive than negative associations to their mothers and thus having more positive than negative implicit opinions towards her. The question that this study is trying to answer is whether the attachment style that a person has according to the two tests can be traced in the implicit affective associations to the caregivers that the priming task measures.

### *Results*

The first part of the analysis was to investigate if there was a correlation between the ASQ-Sw test and the SBST test. The ASQ-Sw resulted in five different sub-scale scores ranging from 1 to 6 as described in Methods, where having a mean score of 4 or higher on the "confidence in self and others" scale indicates evidence of a secure attachment. The four narratives from the SBST test were scored for the presence of a secure base script. Three different attachment scores were calculated, one for attachment to mother, one for attachment to father and one general, the stories were scored and assessed by a trained, reliable coder (not the author). Based on the ASQ scores, 17 participants (n=17) were classified as secure, 11 being female and 6 being male, while 16 (n=16) were classified as insecure, 10 being female and 6 being male. According to SBST test, 12 participants (n=12) were identified as being secure in general, 10 of them being female and 2 male and 21 participants (n=21) as insecure, 11 of them female and 10 male. A total of 15 participants (n=15) were classified as being secure in relation to the mother, 12 being female and 3 male and 18 having an insecure attachment to the mother, 9 females and 9 males, furthermore, 15 participants (n=15) were classified to have a secure attachment to the father, 12 females and 3 males and 18 having an insecure attachment, 9 females

and 9 males. This results indicated some interesting gender differences, the females attachment scores in relation to the mother, father and in general were significantly higher than the males' scores in relation to the mother, father and in general, as assessed by the SBST test but there were no differences between male and female scores on the ASQ test. The SBST test scores were not influenced by the stories' word length and there were no differences between female and males regarding word length in the SBST stories. See Table 1.

Table 1 *Independent samples t-test of means*

<i>Means (SD)</i>						
	<b>Females</b>	<b>Males</b>	<b>Difference</b>	<b>t</b>	<b>d</b>	
SBST-Total	3.74 (0.99)	2.75 (0.79)	0.99	2,36	1,1*	
SBST-Mother	3.73 (0.97)	2.92 (0.87)	0.81	2,4	0,88*	
SBST-Father	3.75 (1.10)	2.98 (0.89)	0.77	2,06	0,77*	

**Not: \*p<.05; \*\*p<.001**

The result of the correlation analysis was the following, the ASQ-Sw sub-scale that measures secure attachment, “Confidence in self and others”, correlated significantly with the SBST total score, it also correlated with the SBST father score for the participants but it did not correlate significantly with the SBST mother score. One of the two ASQ-Sw sub scales measuring avoidant attachment “Discomfort with relationship” correlated with the SBST total score and with SBST mother score and SBST father score. The other sub scale measuring avoidant attachment “Relationship as secondary” correlated with the SBST total score and with SBST father and mother score, respectively. The two sub scales measuring the anxious attachment in ASQ-Sw did not correlate significantly with any of the SBST measures. See Table 2.

Table 2: *Correlation matrix for variables from ASQ and SBST*

	SBSTTotal	SBSTMamma	SBSTPappa	PWR	DWR	CSO	RAS
SBSTMamma	.946**						
SBSTPappa	.954**	.806**					
PWR	-.199	-.143	-.231				
DWR	-.537**	-.420*	-.595**	.092			
CSO	.404*	.235	.521**	-.592**	-.622**		
RAS	-.570**	-.555*	-.529**	.082	.408*	-.322	
NFA	-.248	-.173	-.294	.360*	.350*	-.280	-.042

**Note:** \* $p < .05$ ; \*\* $p < .001$  PWR= Preoccupation with relationship, DWR=Discomfort with relationship, CSO=Confidence in self and others, RAS=Relationship as secondary, NFA= Need for approval

The analysis of the results from the PT started with excluding RTs that were below 250ms (<250ms) and above 1500ms (>1500ms), this was done because it is thought that a RT to a word combination that is faster than 250ms is initiated before the subject was prompted to press. RTs above 1500ms were excluded because the answer *yes* or *no* to the word combination probably involves too much conscious reflection which is not what is sought to be measured, what is sought to be measured is quick implicit reactions to these word combinations. This analysis resulted in removal of 18.6% of the total data, which is close to the recommended cut-off percentage for studies measuring reaction times (Baayen & Milin, 2010). Similar approaches to exclusion of outliers have been employed in other studies measuring attachment with RTs (e.g., Mikulincer & Shaver, 2003, 2004; Carr & Landau, 2012). In an attempt to explain the numerous long RTs in the data, an analysis of the target words was done based on length, word frequency

(based on the corpus used) and valence, in relation to the average RT for each word. A significant correlation between word length (number of characters in word) and RT was found ( $r = .30$ ,  $p = .001$ ) but no effect of any of the other factors. This analysis was done on the dataset containing RTs from 250-10.000 ms since most of the long RTs can be found there.

After the exclusion of RTs below 250 ms and above 1500 ms, the mean RT for each subject for all the different trials were done, that is Gandhi-positive words, Gandhi-negative words, Hitler-positive words, Hitler-negative words, Mother-positive words, Mother-negative words, Father-positive words and Father-negative words. Then the mean difference in RT for each subject between the combination Gandhi-positive words and Gandhi-negative words, Hitler-negative words and Hitler-positive words, Mother-positive words and Mother-negative words, Father-negative words and Father-positive words were calculated. A paired samples T-test analysis (see Table 3) indicates that participants reacted faster to the 27 combinations of Gandhi-positive words compared to the 27 Gandhi-negative word combinations. On average the participants also reacted faster to the 34 Mother-positive word combinations than to the 36 Mother-negative word combinations. This was also true for the 34 Father-positive word combinations compared to the 34 Father-negative word combinations. There was no significant difference between the Hitler-positive word combination and the Hitler-negative combination. There was a significant difference between the father-positive word combinations and the mother-positive word combinations and a difference between the father-negative word combinations and the mother-negative word combinations. See Table 3.

Table 3 *Paired sample t-test of mean RTs*

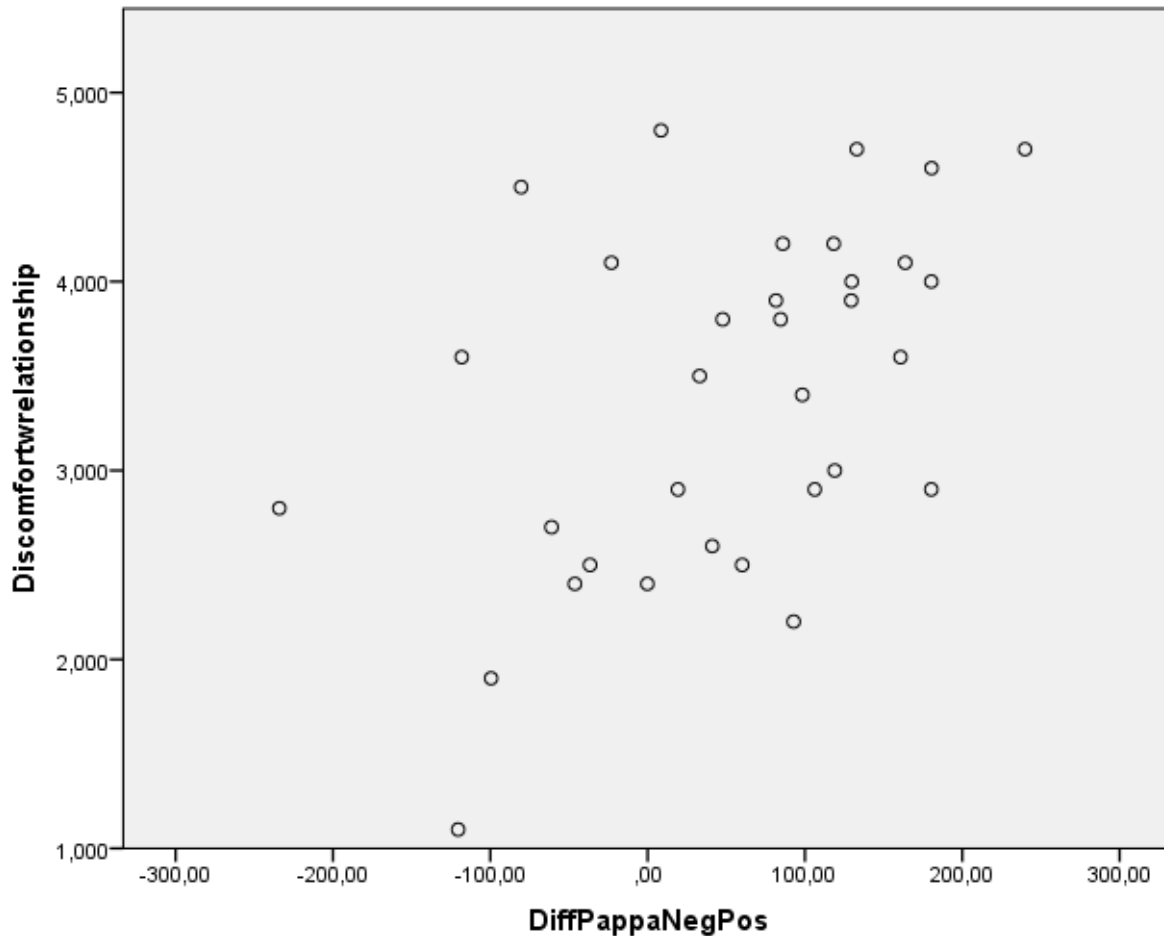
*Paired sample t-test of mean RTs*

Prime	<i>Means (SD)</i>		Difference	<i>t</i>	<i>d</i>
	Negative words	Positive words			
Gandhi	943.79 (146.74)	900.83 (144.39)	42.96	2.62*	0,29
Hitler	940.56 (152.27)	944.5 (155.85)	3.94	.29	-0,03
Mamma	949.71 (147.51)	863.90 (177.94)	85.81	5.24***	0,53
Pappa	987.49 (163.98)	936.76 (168.07)	50.73	2.71*	0,31

**Not: \*p<.05; \*\*p<.001 \*\*\*p<.0001**

The third step of the analysis explored whether attachment style, as measured by any of the two tests used, correlated with the difference in RT between the negative and positive word sets for each prime word (e.g. Mother, Father, Gandhi, Hitler). The ASQ sub-scale “Discomfort with relationship” which measures avoidant attachment styles correlated positively with the difference in RT between the word combinations Father-negative words and Father-positive words ( $r = .486, p = .004$ ), see Figure 3. As can be seen in figure 3, the stronger one's discomfort with relationships, the greater difference between the responses negative attributes-father and positive attributes-father. No other significant correlations between the attachment measurements and the RTs were found.

Figure 3 Scatter plot of DWR scale and PT reaction times.



The ASQ and SBST mother, father and total scores were also transformed into dichotomized variables indicating secure or insecure attachment (1 or 2). This was done by defining a cut-off at 3.75 for each part of the SBST test, mother, father and total score and participants were scored either as 1 (insecure) or 2 (secure) on each part of the SBST test if they had a score under 3.75 on any of the SBST mother, father or total. The ASQ dichotomized variable was created by calculating and creating attachment profiles for every subject and then comparing these to the reference population in the ASQ-Sw version. This was done in order to see if groups based on categorical classifications of attachment would produce significantly different results in the PT, but the results didn't show any significant differences between any of the dichotomized variables.



## *Discussion*

### *Major findings*

The main question of the study was to see if people with different attachment styles displayed different implicit emotional opinions towards their caregivers in a priming task using RTs as an indicator of associative strength to either the positive or negative target words in relation to the prime word, mother or father. The results obtained did not follow the predictions made, only one measure of attachment correlated with the PT, the sub-scale “Discomfort with relationship” of the ASQ-Sw questionnaire. Although several differences were found in the PT itself, participants in the study had more positive than negative emotional opinions towards their mothers and fathers and they had more positive emotional opinions towards their mothers compared to their fathers. The participants also had more positive opinions towards Gandhi than Hitler, the emotional opinions towards Hitler was neither positive nor negative. About half of the participants were classified as having a secure attachment according to the ASQ-Sw test and the other half having an insecure attachment. According to the SBST test, less than half of the participants were classified as having a secure attachment, thus more having an insecure attachment and females having more secure attachment in general as assessed by the SBST than men but not according to the ASQ-Sw. Several correlations between the SBST scores (mother, father and total) and the ASQ-Sw sub-scales were also found, indicating that the attachment scores in this study are coherent to some extent.

### *The attachment assessment*

The results of the two attachment assessment methods used showed that there is a relationship between attachment security and the presence of a secure-base script in our participants. Being confident in oneself, being able to trust and confide in others and feeling at ease in relationships are emotional and behavioral indicators of having a secure attachment style, by using a self-report questionnaire like ASQ-Sw you can assess these presence of these indicators in people and based on theory these are closely linked to attachment security-insecurity (Feeney, Hanrahan, Noller, 1994). Secure-base-scripts are on the other hand like short instructions that the person has learned about what to do when in distress in order to get calmed and helped, in childhood, an activation of a fully developed secure-base-scripts leads to closer

proximity to the caregivers. The secure-base-scripts are thought to be the building blocks of a person's IWM's which in its turn guide and affect a person's emotional life and behaviors (Main et al., 1985; Fivush, 2006)

The relationship that was found in this study is the presence of a secure-base-script and the behavioral and emotional indicators of a secure attachment style and vice versa, a lesser developed secure-base-script and lesser display of the emotional and behavioral indicators of a secure attachment, thus an insecure attachment. This is supported by previous research, a presence of a secure-base-script in an individual is been known to be related to a secure attachment style and its associated consequences regarding a person's behaviors and emotions and this was done, just as in this study, by using a narrative-based assessment methods to investigate the presence of secure-base-scripts and a self-report questionnaire assessing attachment styles or an attachment interview (Waters & Waters, 2006; Mikulincer, Shaver, Sapir-Lavid & Avihou-Kanza, 2009; Psouni & Apetroaia, 2013). This could be another indicator that early developed knowledge about the oneself, others and the world, that is secure-base-scripts, which also is very generalized knowledge and lower in hierarchy of the IWM's, does clearly affect a person's socio-cognitive functions like emotional reactivity and adaptive functions like self-esteem and more explicitly their relationships and views of the world (Waters & Waters, 2006; Dykas, Woodhouse, Cassidy, Waters, 2006; Mikulincer, Shaver, Sapir-Lavid & Avihou-Kanza, 2009; Psouni & Apetroaia, 2013). However, what hasn't been done before is to establish a relationship between these two specific test used, the SBST test and the ASQ-Sw test, the English version of the ASQ test hasn't either been tested in relationship to a narrative-based method like the SBST test. Our findings are the first evidence of such a relationship.

The percentage of participants in this study who was classified as either secure or insecure (51% was secure and 49% insecure according to the ASQ-Sw) is similar to what has been found in other studies when measuring attachment through questionnaires, the percentage of secure individuals in studies having large samples is 50% - 65% (Hazan & Shaver, 1987; Baldwin, Fehr et al, 1993; Mikulincer et al, 2000; Davies, Macfarlane, McBeth, Morriss & Dickens, 2009). The percentage of individuals receiving scriptedness scores in the SBST test such that they could be suggested to have insecure attachment representations (lacking scripted knowledge of secure base) is a bit higher (39% classified as secure and 61% as insecure) than

what other studies assessing attachment have shown, as mentioned earlier (Hazan & Shaver, 1987; Baldwin, Fehr et al, 1993; Mikulincer et al, 2000; Davies, Macfarlane, McBeth, Morriss & Dickens, 2009) But note that previous studies using a narrative-based test for assessing the presence of a secure-base script have demonstrated strong association with other known instruments for assessing attachment, as in this study, but did not report specific percentages of secure/insecure classifications in their samples based on attachment script assessments (Coppola et al., 2006; Waters & Waters, 2006; Psouni & Apetroaia, 2013). The high percentage of low scriptedness scores obtained by the SBST test in this study may be related to the fact that, in this investigation, we changed the mode of administration of the test, allowing participants to type their narratives on the computer, while all previous assessments of attachment scripts administered the test orally.

In SBST test there were also some interesting gender differences, females had in general higher scores on all three measures (mother, father and total), which cannot be attributed to females writing longer and more elaborate stories, since no such differences were found and word length of the stories was independent of SBST scores. The SBST test as administered in this study resulted in similar percentages of secure/insecure females in relation to the other test used, the ASQ-Sw and also to other studies assessing attachment in general (Hazan & Shaver, 1987; Baldwin, Fehr et al, 1993; Mikulincer et al, 2000; Davies, Macfarlane, McBeth, Morriss & Dickens, 2009). So the main reason for the higher proportion of low scriptedness scores, and therefore higher percentage of insecure classifications was that many males were classified as insecure. So it cannot be excluded that the prompted word sets were more suitable for assessing the presence of a secure-base script in females than in men – but previous studies have not found any evidence of such an effect (Dykas et al., 2006; Psouni & Apetroaia, 2013). Another possibility is that males rushed through texting their stories, while females complied with the instructions for the test and tried to produce elaborate stories, as instructed. Finally, it is also possible that more insecurely attached men occurred in the sample. One also has to remember that narrative-based assessments of attachment measures the presence or non-presence of a secure-base script in individuals which has shown correlated strongly with the classifications of secure/insecure attachment in the AAI test and self-report questionnaires, but they don't always match perfectly, which could be another reason for the results.

Another interesting finding is that the SBST scores for the attachment to father correlated more negatively with three ASQ sub-scales measuring insecure attachment and more positive with the ASQ sub-scales measuring secure attachment compared to the SBST scores for mother. One possible reason for this is that in our sample, participants secure-base-scripts involving father played a greater importance than secure-base-scripts involving mother in the development of attachment, this has been found in at least one other study but for kids in middle-age (Steele et al., 2005).

### *The priming task*

The PT showed that the participants in our sample had more positive than negative emotional opinions towards their mothers and fathers and the person Gandhi but towards the person Hitler there were no differences, people also had more positive opinions towards their mothers compared to their fathers in general. It is difficult to interpret the results of the PT in a more elaborate way since there were no other differences between classified secure compared to insecure participants and their RTs in the PT test, or associations between the RTs and the attachment-related continuous measures. However, if assuming that people in general have more positive than negative opinions towards their caregivers then it is safe to say that the PT does actually measure the implicit emotional opinions it was designed to measure which renders validity to this exact design (type prime and target words, SOA's, number of words), which has not been tested before in any other study. Other studies investigating the influence of attachment on affective associations in memory structures with priming tasks have done it by subliminally priming the person with threatening words and measuring the RT to their caregivers, shorter RT means that in times of threat the caregiver is more accessible in the mind of the subject, other studies have used “my partner” as prime instead. The finding that people have more positive emotional opinions towards their mothers than fathers could be explained by mothers in general are more affective and caring towards their children and in that way creates stronger emotional bonds and reactions to their children than the father (see Cassidy & Shaver, 2008).

The fact that the primes mother, father and Gandhi resulted in significant differences when comparing the positive and negative trials for these primes is interesting since the prime Hitler didn't create any significant differences between the positive and negative trials. If one assumes that people will view mother, father and Gandhi as something emotionally positive

and Hitler as something emotionally negative then it would seem like our participants were not able to create enough negative emotion towards the Hitler trials and thus not activating the associative networks of words strongly enough to be able to react quick enough when seeing the target words. The mother and father primes were stronger primes than the Hitler and Gandhi primes since they created greater differences between the positive and negative word trials but the trials using Gandhi as a prime word only showed an 8 ms lesser differences than the father prime, so the Gandhi trial was quite powerful too but not the Hitler ones.

### *The influence of attachment in relation to the priming task*

Only one measure of attachment correlated with the PT, the continuous sub-scale “Discomfort with relationship” of the ASQ-Sw questionnaire, which gives indications of an insecure attachment style of an avoidant kind, correlated positively and significantly with PT results for the emotional opinions about fathers. People scoring high on the “Discomfort with relationship” sub-scale, indicating that they often experience anxiety and discomfort in close relationships and prefer to keep people at distance to avoid getting hurt took longer average RT for negative target words than positive ones in relation to the priming word father, the latter indicating that negative words and emotions are less associated with father than positive. This is not in line with attachment theory and predictions based on it, since individuals with more negative experiences with their father (who would take less time to respond to negative father attributeds) would demonstrate an avoidant attachment style and therefore more “Discomfort in relationship”. An alternative explanation for this could be that people who exhibit an avoidant attachment are deactivating their attachment system when primed with names of caregivers and thus not activating and displaying negative emotions, this has been found by (Mikulincer et al., 2000, 2002) before in priming tasks. Categorical classifications (dichotomized variables) of insecure and secure attachment from ASQ scores were made but it didn't yield any significant correlations with RTs either.

So the results are a bit of a puzzle, people with insecure attachment do not display more negative or less positive emotions towards their caregivers than people with secure attachment do. One reason for this could be that the priming task did not manage to separate the negative emotional associations the insecurely attached participants in our study are assumed to have towards their caregivers from the normalized, idealized view of them they develop in order to

mask this assumed negative emotional association. . Another plausible explanation is that the attachment styles are prone to variability. Baldwin and Fehr (1995) found that 30 % of participants in studies change their attachment style between from one time to another, proposing that what is measured is probably the schemata or part of the attachment constructs that is activated at the time of measurement and not the whole enduring disposition of attachment. By looking at it this way, the instruments that measure attachment may be reliable and valid but it is hard to capture all the facets of a person's attachment system at any one time. That is why stability in measurements can't be expected or assumed.

### *Methodological considerations*

None of the other attachment measurements but “Discomfort with relationships” correlated with the RT test while other similar studies have shown some significant associations between attachment styles and RTs in priming experiments measuring processing of attachment related information regarding caregivers or partners (Mikulincer, Birnbaum, Woddis, & Nachmias, 2000; Mikulincer, Hirschberger, Nachmias, & Omri Gillath, 2001; Mikulincer, Gillath, & Shaver, 2002; Dolev & Shaver, 2004; Zayas & Shoda, 2005; Zayas, et al, 2009; Carr & Landau, 2012). One possible problem in this investigation was its sample size, this study had 33 participants while the study sample size of the studies above were usually greater (from 50-250). This could be one of the reasons for the non-significant results.

Another reason for our very few significant findings could be the SOA being used in this study, 250ms, which is somewhat long compared to other studies that were able to show significant correlations between attachment styles and RTs, as they were using subliminal priming (>50ms).

One other methodological flaw could be that the ASQ and SBST tests were administered before the PT and thus affecting the results of the PTs. Exactly what kind of effects this order of administering the test gave rise to is hard to say but one possible effect could be that the ASQ-Sw and SBST activated attachment related constructs in the participants and this affected the results of the PT but since there was not enough significant correlations between the attachment scores and the PT it is hard to say what the effects were.

The fact that the SBST test was administered electronically could also have affected the results. Another flaw is that some of the ASQ-Sw sub-scales suffered from low internal consistency, as the Cronbach's alpha for the sub-scale "Preoccupation with relationship" was .455 and for "Relationship as secondary" .506 and "Need for approval" had .596 while the others were above .8. So even though the results of the attachment scores are discussed previously here as interesting findings, one should keep in mind the low internal consistency of some of the sub-scales.

A final methodological problem could be the long RTs which were excluded, this tells us that people may not have reacted and answered by using their implicit emotional opinions but rather given more conscious thought to their answers. By excluding all RTs above 1500 ms from the analysis, 18.6% of the data was lost, which means that if those 18.6% of the data had been below 1500 ms the results may have been different. A reason for the long RTs could have been the use of too long words since there was a significant correlation between number of characters and average RT in our data set.

### *Conclusions and future recommendations*

This study was able to show a correlation between two attachment tests that has not been investigated before. The ASQ test and SBST test correlated with each moderately in general and their respective sub-scales that measure more specific parts of attachment, also correlated with each other. This is valuable new knowledge since it could be an indication that you can measure different aspects of the attachment related systems in a person and still get cohesive results and that attachment styles are evident throughout different parts of cognitive and mental systems. It is hard to say if administering the SBST test electronically did not affect results since the percentage of insecure individuals (lacking a secure-base script) was a bit higher than other tests assessing attachment, one reason could be the administration of the test electronically, so more studies needs to test it before one can say more about the effects. Females in the sample had in general higher scores on the SBST attachment test but there were no significant differences in ASQ test. Furthermore, the study validated a known priming paradigm measuring RTs, on average participants had shorter RTs to positive words than negative words in combination with all three priming words Gandhi, Father and Mother, showing that the priming paradigm successfully can tell us something about peoples implicit emotional opinions towards others,

why the same results was not obtained for the prime word Hitler is discussed in the previous chapter. The study was not very successful in showing that attachment style influences peoples' implicit emotional opinions about their caregivers in a priming test measuring RTs, as only one significant effect was found. This non-effect could stem from a small sample size in this study and other factors discussed earlier.

So future studies should use as short words as possible, and in order to shed more light in these associations between implicit evaluations of caregivers and attachment, future studies may have to keep the SOA even shorter or use subliminal priming, plausibly using another type of control measure such as non-words, as it is unclear whether general figures are associated with strong enough attributes and emotions. What also can be used is a WHOTO scale (Hazan, Hutt, Sturgeon, Bricker, 1991; Fraley & Davis, 1997) where, instead of using the words "mother", "father" or "my partner", researchers let participants name the real names of their caregivers or significant others and use them in the PT. This may activate the attachment related systems in a different way. As for the attachment measures, using other measures than ASQ and SBST in relation to RTs could be interesting. Also changing the order of administering the three tests is important, ideally one should administer the PT first and then the two attachment tests or even administering the PT and attachment tests on different occasions if possible. Having a larger sample size is of course another suggestion for future studies.



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## Appendix 1.

Target words for control trial (Prime words Hitler & Gandhi) 1 = Positive valence 2 =

Negative

Word	Word length	Frequency	Valence
Accepterande	12	174	1
Arg	3	21265	2
Avskyvärd	9	144	2
Behaglig	8	1535	1
Brutal	6	1229	2
Etisk	5	220	1
Farlig	6	3836	2
Fientlig	8	213	2
Fredlig	7	621	1
Fridfull	8	427	1
Föraktande	10	9	2
Föraktfull	10	65	2
Förnuftig	9	274	1
Generös	7	1493	1
Givmild	7	271	1
Glad	4	119667	1
Godhjärtad	10	234	1
Grotesk	7	275	2
Grym	4	18815	2
Hatisk	6	311	2
Hemsk	5	6487	2
Hjärtlös	8	139	2
Hotfull	7	347	2
Inbjudande	10	793	1
Klok	4	4221	1
Kränkande	9	1774	2
Kuslig	6	254	2
Känslolös	9	64	2
Kärleksfull	11	1147	1
Kärvänlig	9	41	1
Lömsk	5	190	2
Medkännande	11	131	1
Medlidsam	9	15	1
Moralisk	9	699	1
Motbjudande	11	579	2
Obehaglig	9	2026	2
Ondsint	7	76	2
Ondskefull	10	145	2
Osjälvisk	9	90	1
Otäck	5	1117	2
Ryslig	6	66	2
Rättvis	7	2142	1
Sadistisk	9	88	2
Samvetsgrann	12	13	1
Skamlös	7	84	2
Tilltalande	11	1026	1
Tolerant	8	412	1
Trivsamt	7	352	1
Vidrig	6	1463	2
Våldsam	7	1337	2
Välvillig	9	102	1
Vänskaplig	10	99	1
Ödmjuk	6	1502	1
Öppensinnad	11	70	1

## Appendix 2

Target words for mother-father trial.

Word	Word length	Word frequency	Valence
Avskärmad	9	386	2
Avvisande	9	135	2
Brysk	5	33	2
Delaktig	8	962	1
Distanserad	11	67	2
Dömande	7	291	2
Elak	4	4644	2
Empatisk	8	242	1
Engagerad	9	2000	1
Frånvarande	11	11	2
Förlåtande	10	338	1
Förstående	10	1027	1
Försummande	11	14	2
Harmonisk	9	1189	1
Hjälpsam	8	745	1
Hänsynsfull	11	35	1
Hänsynslös	10	208	2
Icke-dömande	11	66	1
Icke-hjälpsam	12		2
Icke-stödjande	13		2
Ignorerande	11	13	2
Intolerant	10	184	2
Intresserad	11	16416	1
Kall	4	9214	2
Kritiserande	12	30	2
Kritisk	7	2393	2
Likgiltig	9	386	2
Lugnande	8	1873	1
Lyhörd	6	4319	1
Nedsättande	11	219	2
Negativ	7	4201	2
Närvarande	10	5543	1
Oengagerad	10	134	2
Ogillande	9	200	2
Ointresserad	12	942	2
Okänslig	8	208	2
Omsorgsfull	11	54	1
Omvårdande	10	29	1
Opålitlig	9	222	2
Osympatisk	10	123	2
Otillförlitlig	14	184	2
Otrevlig	8	1987	2
Ouppmärksam	11	90	2
Positiv	7	9525	1
Pålitlig	8	541	1
Påträngande	11	372	2
Respektfull	11	70	1
Respektlös	10	191	2
Skyddande	9	744	1
Snäll	5	19569	1
Stödjande	9	150	1
Sympatisk	9	634	1
Sårande	7	125	2
Tillbakadragande	16	176	2
Tillförlitlig	13	184	1
Tillgiven	9	72	1
Tillgänglig	11	2607	1
Tröstande	9	293	1
Undvikande	10	155	2
Upplyftande	11	537	1
Uppmuntrande	12	986	1
Uppmärksam	10	1334	1
Upprörande	10	758	2
Varm	4	23872	1
Ärlig	5	10045	1
Ömsint	6	147	1
Öppen	5	11793	1
Överbeskyddande	15	197	2